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STANDARD CHLORINE OF DELAWARE, INC.

100418

GOVERNOR LEA ROAD • P.O BOX 319 • DELAWARE CITY, DELAWARE 19706

July 15, 1993

Ms. Anne Hiller
DNREC
Division of Air and Waste Management
715 Grantham Lane
New Castle, DE 19720

RE: Follow-Up Activities to the Feasibility Study

Dear Ms. Hiller:

The following is provided by Standard Chlorine of Delaware, Inc. (SCD) in response to your June 23, 1993 letter regarding the referenced activities.

1. SCD has estimated the expense for excavation in the railroad track area to be between $1,549,250 and $3,295,500 for both the capital cost and loss of revenue associated with reduced and/or interrupted production. The estimate assumes the removal of all four tracks beginning at a point on the south at the approximate location of the 1986 spill event through the northern terminus of the rail siding. The ballast and underlying soil are assumed to be excavated to a depth of 3-feet below surface grade in an area measuring approximately 550 x 75 feet. A flexible membrane liner and perforated pipe drainage system are assumed to be installed in the base of the excavation to collect and convey storm water infiltration. The balance of the excavation would be filled with select backfill. All existing components of the tracks would be reinstalled including ties, rails, joint bars, tie plates and end of track bumpers. Fastening hardware (spikes, bolts, etc.) and any defective or worn parts will be replaced.

   Loss of revenue is associated with decreased production capacity using pipeline versus railcar supplied chlorine and disruptions for process piping modifications.

   A summary of costs and plot plan depicting the extent of excavation are attached.

2. The license agreement by and between SCD and Occidental Chemical Company and the subsequent extension for the use and access to land north of the SCD facility is attached.

3. Calculations related to the determination of probable areas of Dense NonAqueous Phase Liquids (DNAPLs) and a plan presentation of the results are attached. These are based upon the methods discussed in our meeting of May 10, 1993.

Please feel free to call should you have any further questions regarding these matters.

Very truly yours,

Paul Johnston
Manager, Environmental

PJ/dm
Attachment
pc: R. J. Touhey

Cost Estimate for Excavation of Soils at Rail Siding

Tasks	Quantity	Unit Costs ($)	Total Costs ($)		
Capital Costs					
1. Excavation	4500 cy	15/cy	$67,500		
2. Backfill (Clean Select)	4500 cy	10/cy	$45,000		
3. Liner and Drainage System	4500 sy	40/sy	$180,000		
4. Erosion and Sediment Control	1250 Lf	10/Lf	$12,500		
5. Track Removal and Instillation	2200 Lf	75/Lf	$165,000		
6. Process Modification	LS		$10,000		
Subtotal			$480,000	$480,000	$480,000
7. Remediation of Excavated Soil					
Stabilization	5000 cy	25/cy	$125,000		
Thermal Treatment	5000 cy	150/cy		$750,000	
Biological Treatment *	5000 cy	75/cy			$375,000
Subtotal			$605,000	$1,230,000	$855,000
8. Administration and Construction Services (20%)			$121,000	$246,000	$171,000
9. Contingency (25%)			$151,250	$307,500	$213,750
Sub-Total - Capital Costs			$877,250	$1,783,500	$1,239,750
Production Revenue Loss			$672,000	$1,512,000	
Total			$1,549,250	$3,295,500	

* Note: Biological treatment unit costs estimated at $75-$150/cy. Therefore, the upper cost estimate would be equal to total for thermal treatment.

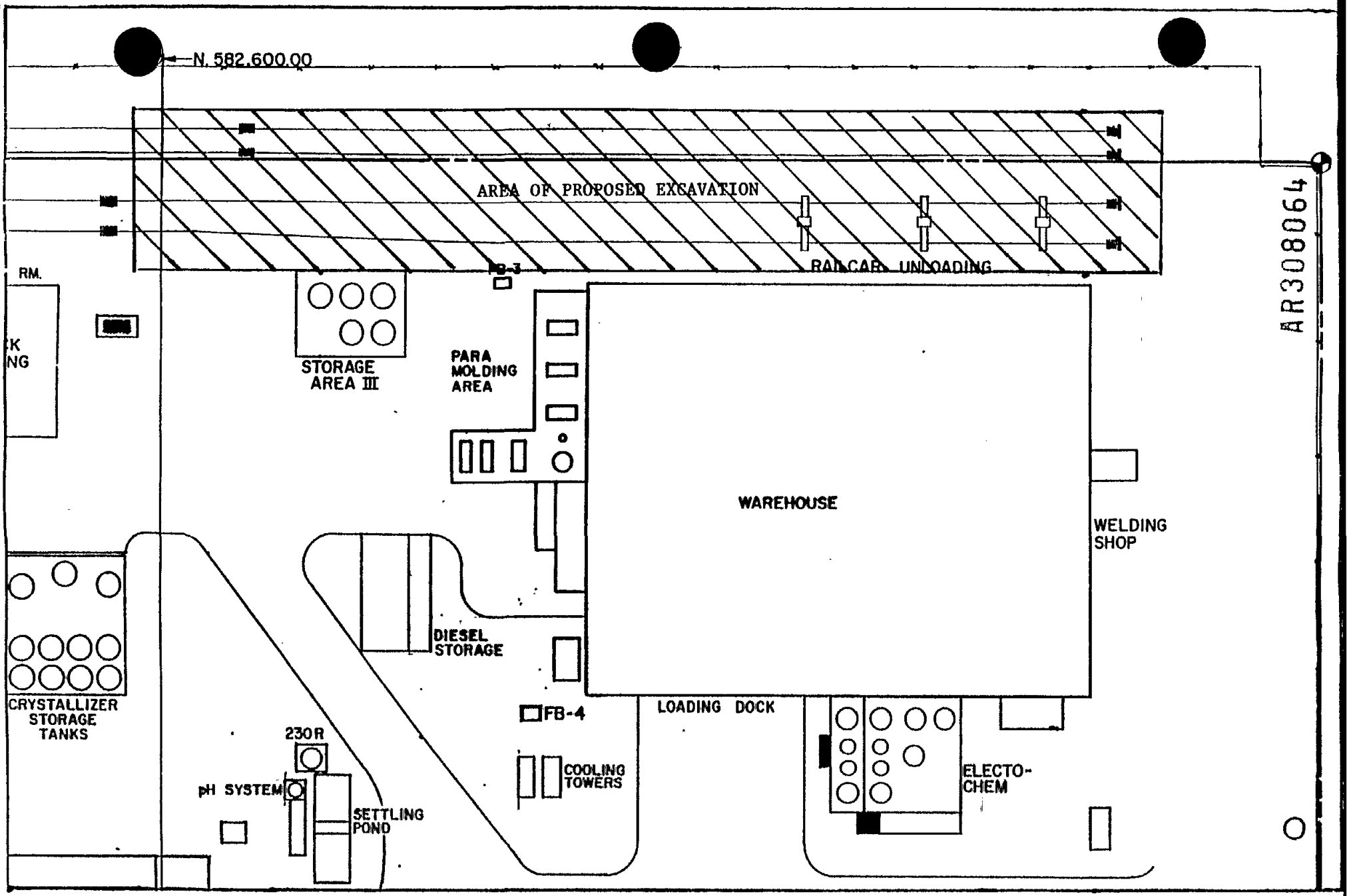


FIGURE 1

STANDARD CHLORINE OF DELAWARE, INC
CHLORINE RAILCAR UNLOADING AREA
PROPOSED LIMITS OF EXCAVATION

Determination of Area of Dense NonAqueous Phase Liquids

Assumptions:

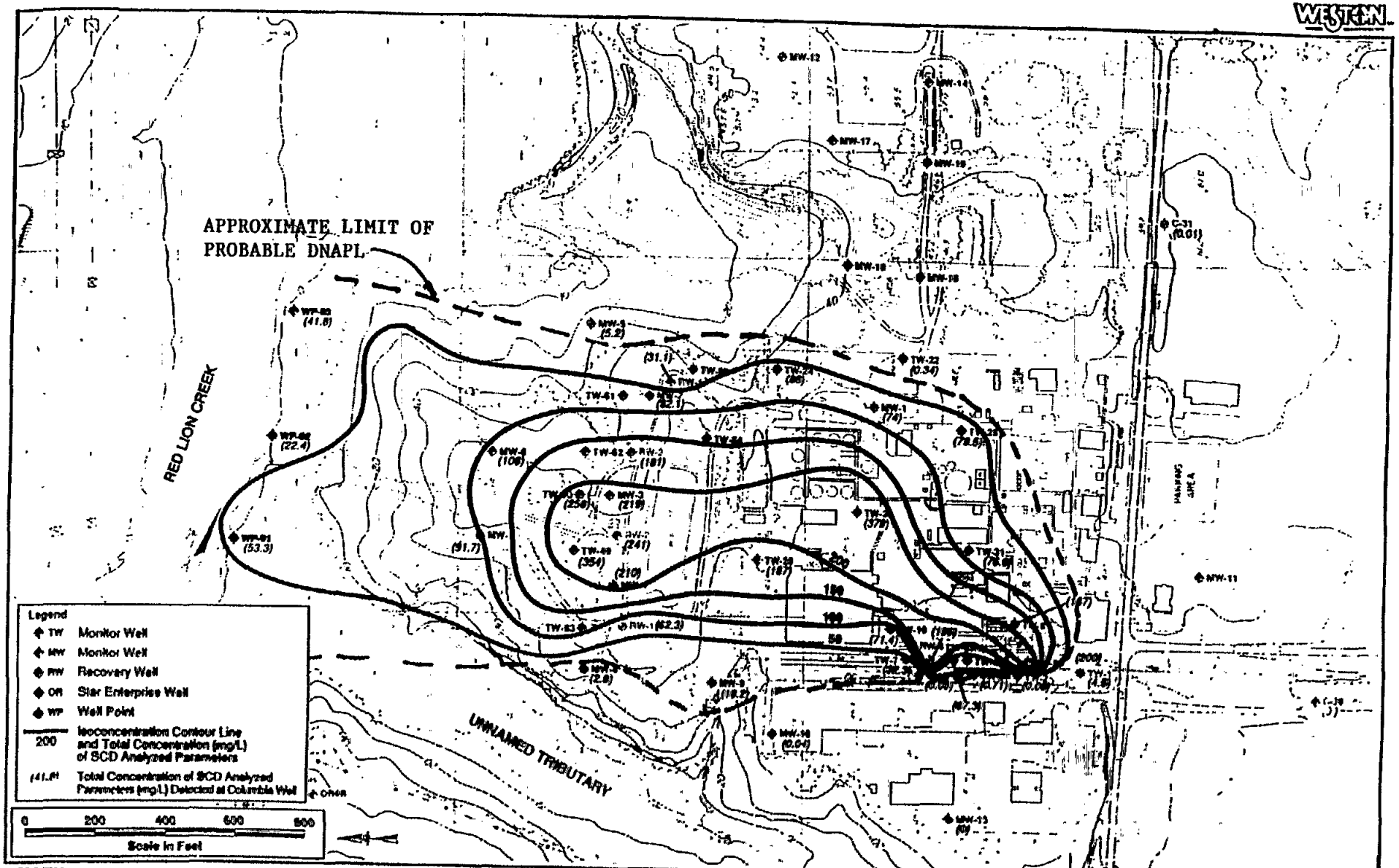
- The relative concentration of individual benzene/chlorobenzene compounds in the dissolved phase are consistent with those present in DNAPLs.
- Average values for individual benzene/chlorobenzene compound concentrations for all on-site wells are representative of groundwater quality.
- Areas of probable DNAPLs are represented by any sample location where total chlorobenzene concentration exceed 1% of the maximum effective solubility of the chlorobenzenes.

Calculations:

Compound*	Average Concentration mg/l	Weight Percent	Mole Fraction	Pure Phase Solubility mg/l	Effective Solubility mg/l
Benzene	16	15.5	0.305	1780	543
Chlorobenzene	39	38	0.661	500	330
1,2 Dichlorobenzene	28	27	0.276	100	28
1,4 Dichlorobenzene	17	16.5	0.152	79	12
1,2,4 Trichlorobenzene	3	3	0.020	30	0.6
				Total	913.6

Probable DNAPL = 913.6 x 0.01 = 9.14 mg/l

* Listed compounds account for >98% of the concentration of total benzene/chlorobenzene in average groundwater sample.



NOTE: DRAWING REVISED BY STANDARD CHLORINE OF DELAWARE, INC. TO SHOW APPROXIMATE LIMIT OF PROBABLE DNAPL.

FIGURE 2 ISOCONCENTRATION MAP OF TOTAL CONCENTRATIONS OF SCD ANALYZED PARAMETERS IN COLUMBIA FORMATION STANDARD CHLORINE OF DELAWARE, INC.